

Autonomous Power Controller for Mission Critical Microgrids, Phase I

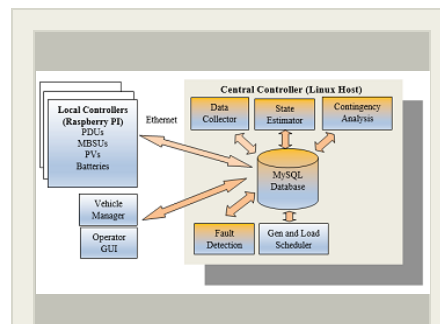
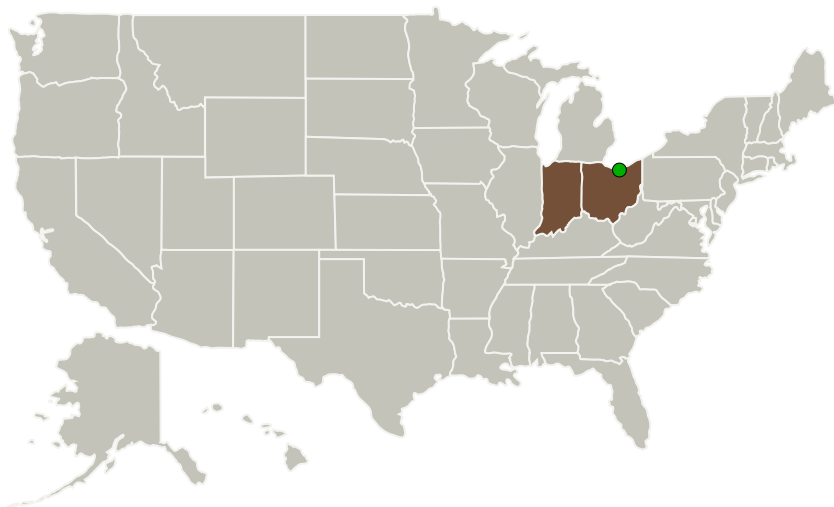


Completed Technology Project (2017 - 2018)

Project Introduction

PCKA is partnering with researchers at CWRU to develop an Autonomous Power Controller (APC) for mission-critical microgrids to supply electric power in a highly autonomous and secure manner to accomplish mission objectives. The APC consists of a centralized controller connected to an array of local component controllers. The centralized controller will be capable of optimal generation and load scheduling, abnormal conditions and/or failure detection, and system restoration, while the local controllers monitor system components and pass sensor data to the centralized controller. The core of the APC is a database architecture that facilitates data movement to enable the various control functions. The design of this database was carried out by the PI, Dr. Hong, in a 2016 collaboration with NASA GRC, and it will be leveraged in this STTR effort to support the expansion of the APC. The effort will also utilize a spacecraft system simulator tool developed by PCKA. Therefore, the team is well-placed to successfully develop the APC. Potential applications of the APC will be in deep space explorations, aeronautic flights, and special human habitats, where human supervision of the electric power systems is limited and availability of electric power is critical to mission success.

Primary U.S. Work Locations and Key Partners



Autonomous Power Controller for Mission Critical Microgrids, Phase I Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
PC Krause and Associates, Inc.	Lead Organization	Industry	West Lafayette, Indiana
Case Western Reserve University	Supporting Organization	Academia	Cleveland, Ohio
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Indiana	Ohio
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Project Transitions

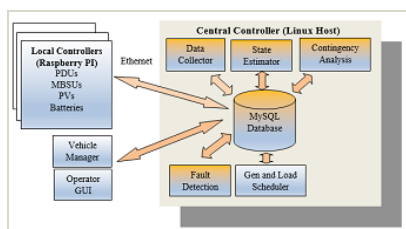
▶ **June 2017:** Project Start

✓ **June 2018:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140852>)

Images



Briefing Chart Image

Autonomous Power Controller for Mission Critical Microgrids, Phase I
Briefing Chart Image
(<https://techport.nasa.gov/image/135205>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

PC Krause and Associates, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

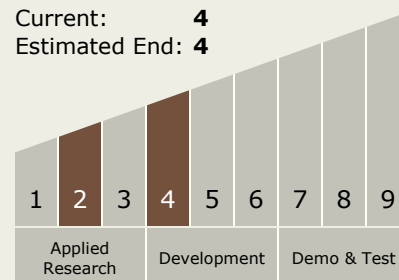
Carlos Torrez

Principal Investigator:

Mingguo Hong

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.3 Power Management and Distribution
 - └ TX03.3.1 Management and Control

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System